In the Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the Application:

1. (Currently Amended) A method of calibrating a quantum key distribution (QKD) ~~QKD~~ system having a first QKD station (Bob) with a first modulator (MB) [[,]] and a second QKD station (Alice) with a second modulator (MA), comprising:

a) operating the QKD system with a first modulator basis voltage value $V_B(1)$ for the first modulator and varying ~~the~~ a basis voltage V_A ~~of~~ for the second modulator to establish a first basis voltage value $V_A(1)$ for the second modulator that yields constructive interference of detected quantum pulses;

b) operating the QKD system with the first modulator basis voltage value $V_B(1)$ for the first modulator while varying the basis voltage V_A ~~of~~ for the second modulator to establish a second basis voltage value $V_A(2)$ for the second modulator that yields destructive interference of detected quantum pulses;

c) operating the QKD system with a second modulator basis voltage value $V_B(2)$ for the first modulator and varying the basis voltage V_A ~~of~~ for the second modulator to establish a third basis voltage value $V_A(3)$ for the second modulator that yields constructive interference of detected quantum pulses; and

d) operating the QKD system with the second modulator basis voltage value $V_B(2)$ for the first modulator while varying the basis voltage V_A for ~~of~~ the second modulator to establish a fourth basis voltage value $V_A(4)$ for the second modulator that yields destructive interference of detected quantum pulses.

2. (Currently Amended) The method of claim 1, including:

e) operating the QKD system with basis voltages for the first and second modulators that would be expected to yield a 50:50 photon count probability between each of two single-photon detectors;

f) measuring the ~~photons~~ photon count probability using the single-photon detectors; and

g) if the measured photon count probability in f) is not 50:50, varying at least one of the basis ~~voltages~~ voltage values $V_B(1)$ and $V_B(2)$ for the first modulator and

repeating acts a) through f) until the photon counts probability becomes 50:50.

3. (Original) A method according to claim 1, including:

during operation of the QKD system, measuring photon counts in respective first and second single-photon detectors to establish the basis voltages $V_A(1)$, $V_A(2)$, $V_A(3)$ and $V_A(4)$ that yield a minimum photon count in either of the first and second detectors.

4. (Currently Amended) A method of calibrating a quantum key distribution (QKD) ~~QKD~~ system having first and second operably coupled QKD stations Bob and Alice with respective first and second modulators MB and MA driven by respective basis voltages V_B and V_A, comprising:

a) exchanging photons between the QKD stations while fixing basis voltage V_B to a first value $V_B(1)$ and varying ~~the second~~ basis voltage V_A to determine basis ~~voltages~~ voltage values $V_A(1)$ and $V_A(2)$ that correspond to [[a]] either a minimum or maximum photon count; and

b) exchanging photons between the QKD stations while fixing the ~~first~~ basis voltage V_B to a second value $V_B(2)$ and varying the ~~second~~ basis voltage V_A to determine basis ~~voltages~~ voltage values $V_A(3)$ and $V_A(4)$ that correspond to [[a]] either a minimum or maximum photon count ~~; and~~

~~c) operating the QKD system with intentionally selected incorrect basis voltages V_B and V_A and measuring a probability distribution of detecting constructive versus destructive interference between photons modulated by modulators MA and MB to ensure orthogonality of the basis voltages~~ .

5. (Currently Amended) The method of claim [[4]] 13, ~~wherein adjusting the basis voltages in act c) includes~~ including repeating acts a) through c) with one or more different ~~first~~ basis voltage values for voltage V_B if the measured probability distribution is different than 50:50, so as to establish values for basis voltages V_A and V_B that yield the 50:50 probability distribution.

6. (Currently Amended) The method of claim 4, including operating the QKD system with the ~~calibrated~~ basis voltage values $V_B(1)$, $V_B(2)$, $V_A(1)$, $V_A(2)$, $V_A(3)$ and $V_A(4)$.

7. (Currently Amended) The method of claim [[4]] 13, including programming a controller operably coupled to i) modulator drivers ~~(44, 14)~~ that are operably coupled to ~~respective~~ modulators MB and MA, respectively, and ii) to first and second single-photon detectors, to carry out acts a) through [[d)]] c).

8. (Currently Amended) A method of calibrating ~~two~~ first and second modulators ~~MA and MB~~ in a quantum key distribution (QKD) ~~QKD~~ system, comprising:

a) operating the QKD system with a first fixed modulation voltage ~~$V_B(1)$for~~ value $V_B(1)$ for the first modulator ~~MB~~ and varying a modulation voltage V_A ~~of~~ for the second modulator to establish first and second basis ~~voltages~~ voltage values $V_A(1)$ and $V_A(2)$ for the second modulator ~~based on~~ by measuring photon counts ~~in one or more single photon detectors~~; and

b) operating the QKD system with a second fixed modulation voltage ~~$V_B(2)$for~~ value $V_B(2)$ for the first modulator ~~MB~~ and varying [[a]] the modulation voltage V_A of the second modulator to establish third and fourth basis ~~voltages~~ voltage values $V_A(3)$ and $V_A(4)$ for the second modulator based on measuring photon counts ~~in the one or more single photon detectors~~ .

9. (Currently Amended) The method of claim 8, including:

measuring ~~the~~ an orthogonality of ~~the modulation~~ basis voltage values ~~voltages~~ $V_B(1)$, $V_B(2)$, $V_A(1)$, $V_A(2)$, $V_A(3)$ and $V_A(4)$.

10. (Currently Amended) The method of claim 9, including adjusting at least one of the basis voltages so that the basis voltage values ~~voltages~~ are orthogonal if the measurement of claim 9 reveals that the ~~modulation~~ basis voltage values ~~voltages~~ are not orthogonal.

11. (Currently Amended) The method of claim [[8]] 9, ~~including~~ wherein measuring

~~an~~ the orthogonality of the ~~modulation~~ basis voltage values ~~voltages by~~ includes:

c) setting the basis ~~modulation~~ voltages to values expected to yield a 50:50 photon count probability distribution between constructively and destructively interfered photons;

d) measuring the photon count probability distribution; and

e) if the photon count probability distribution is other than 50:50, adjusting at least one of the basis voltages for the first modulator ~~MB~~ and repeating acts a) through d) to achieve a 50:50 photon count probability distribution.

12. (Currently Amended) The method of claim 8, including operating the QKD system with the ~~calibrated~~ basis voltage values $V_B(1)$, $V_B(2)$, $V_A(1)$, $V_A(2)$, $V_A(3)$ and $V_A(4)$ as calibrated basis voltages.

13. (New) The method of claim 4, including:

c) operating the QKD system with basis voltage values other than $V_B(1)$, $V_B(2)$, $V_A(1)$, $V_A(2)$, $V_A(3)$ and $V_A(4)$, and measuring a probability distribution of detecting constructive versus destructive interference between photons modulated by modulators MA and MB to assess orthogonality of the basis voltage values $V_B(1)$, $V_B(2)$, $V_A(1)$, $V_A(2)$, $V_A(3)$ and $V_A(4)$.